

Listing of Claims

1. (Currently amended) An automated cross-connect system suitable for use in a telecommunication network central office comprising a network of communication lines for connecting subscriber locations to a central office exchange (112), said communication lines extend to the subscriber locations from a main distribution frame (MDF) (320) that comprises a plurality of connector blocks (210,220) housed therein for terminating the communication lines from to the subscriber locations and the lines from the exchange, such that the automated cross-connect system being capable of activating cross-connects between the subscriber communication lines and the exchange,

~~characterized in that~~ wherein such that the

modular cross-connect boards, each including a switch matrix comprising a plurality of cross-connect elements, and wherein said modular cross-connect boards are coupled to the connector blocks (210,220) in a scalable manner such that the MDF (320) is automated by selectively controlling the connection state of the plurality of cross-connects remotely via the central office.

2. (Currently amended) An automated cross-connect system according to claim 1 wherein ~~the a~~ remote computer terminal (350,352) communicates with a site controller (332) that supervises the MDF to identify the appropriate modular cross-connect board and the appropriate cross-connect for changing its connection state.

3. An automated cross-connect system according to claim 2 wherein the site controller (332) is linked to the cross-connect boards via a communication link that also provides power for automating the cross-connects.

4. (Currently amended) An automated cross-connect system according to ~~any one of the above claims~~ claim 1 wherein the switch matrix is comprised of sliding engagable contact sledges that are moved into position by an electric motor.

5. (Currently amended) An automated cross-connect system according to ~~any one of the above claims~~ claim 1 wherein the switch matrix comprises a plurality of electrically conductive contacts disposed on PCBs by which any input line can connectable to any output line is achieved by the moving the sledges along different paths and transport planes.

6. (Currently amended) An automated cross-connect system according to ~~any one of claims 4 or 5~~ claim 4 wherein the switch matrix further includes:

a bypass cross-connect for each line for bypassing the switch matrix if, upon installation of the cross-connect board, there is a pre-existing cross-connect made e.g. by jumper wire for the line, and

a reset position for each line for preserving an open line condition that is used when there is no jumper wire installed for the line upon installation of the cross-connect board or when the line is disconnected or removed.

7. (Currently amended) An automated cross-connect system according to ~~any one of the above claims~~ claim 1 wherein the cross-connect boards are mounted in a center stage interconnecting the line side and exchange side communication lines within the MDF cabinet.

8. (Currently amended) An automated cross-connect system according to ~~any one of the above claims~~ claim 2 wherein the remote computer terminal communicates with the site controller via the Internet, Ethernet, or LAN using TCP/IP based protocol, said remote

computer terminal running network management application software (NMS) capable of selectively actuating all cross-connects within the system, verifying line connections, and running trouble shooting diagnostics.

9. An automated cross-connect system according to claim 8 wherein the NMS automatically checks, verifies, and establishes line connections in accordance with standard operator procedures.

10. An automated cross-connect system according to claim 1 wherein the cross-connect boards are installed in MDFs with pre-existing cross-connections established by jumper wires without disrupting the existing connections.

11. An automated cross-connect system according to any one of claims 1 wherein the plurality of cross-connect boards are further located in street cabinets (328) and drop point sites (330) that are in communication with the site controller in a manner such that the plurality of cross-connects are selectively controlled by the remote computer terminal.

12. An automated cross-connect system according to claim 11 wherein the site controller communicates with the street cabinets and drop point sites via modems coupled to a communication link, and wherein power for actuating the cross-connects is supplied over the link.

13. (Currently amended) A method of automating cross-connects using a scalable automated cross-connect system in a telecommunication network central office comprising a network of communication lines for connecting subscriber locations to the central office exchange (112), said communication lines extend to the subscriber locations from a main distribution frame (MDF) (320) that comprises a plurality of connector blocks (210,220) housed therein for terminating the communication lines from

to the subscriber locations and the lines from the exchange, such that the automated cross-connect system being capable of selectively establishing cross-connects between the subscriber communication lines and the exchange, the method is ~~characterized by~~ comprising the steps of:

entering into a remote terminal 352 information related to making a desired connection for establishing or removing a subscriber communication line;

determining the appropriate MDF in the telecommunication network central office;

checking the current allocated resources relating to the MDF from a database;

selecting an available communication line for connection to the exchange;

transmitting commands to the selected MDF comprising a plurality of modular cross-connect boards coupled to the connector blocks (210,220) in a scalable manner, wherein each including a switch matrix comprising a plurality of cross-connects;

identifying and selecting the appropriate modular cross-connect board and cross-connect to activate; and

remotely controlling the connection state of the selected cross-connect on the selected modular cross-connect board via the central office.

14. A method according to claim 13 wherein in the determining step the information is sent to a system gateway (354) which determines whether the subscriber communication line is accessible through the automated telecommunication system.

15. A method according to claim 13 wherein the remote terminal is a computer running network management application software (NMS) transmits commands to a site controller (332) that supervises the MDF to identify the appropriate modular cross-connect board and the appropriate cross-connect for changing its connection state.

16. A method according to claim 15 wherein the site controller transmits commands to and provides power to the modular cross-connect boards via a communication link.

17. A method according to claim 13 wherein the switch matrix comprise a plurality of slidably engagable contact sledges for engaging pairs of electrically conductive contact pads for establishing cross-connects, wherein the contact sledges are moved into position by electric motors.
18. A method according to claim 13 wherein the system is scalable to the growth in subscriber lines within the MDF by coupling further modular cross-connection boards to available connector blocks (210,220).
19. A method according to claim 13 wherein the remote terminal communicates with the site controller via the Internet, Ethernet, or LAN using TCP/IP based protocol.
20. (Currently amended) A method according to ~~any one of claims 15 or 16~~ claim 15 wherein the modular cross-connect boards are installed in street cabinets and drop point sites are automated for control by the remote computer terminal via the site controller, in which signals are transmitted and received via modems coupled to communication link.
21. A method according to claim 13 wherein the NMS automatically tests, verifies, and documents current line connections in accordance with standard operator procedures.
22. A method according to claim 13 wherein the installation of the modular cross-connect boards into the connector blocks (210,220) is non-intrusive and does not disrupt the existing connections.
23. A method according to claim 13 wherein in the transmitting step, a database is updated in accordance with the command for the associated the cross-connect.

24. A method according to claim 15 wherein when the route to the selected cross-connect is "blocked" due to existing connections on the cross-connect board and stage levels such that the site controller determines an alternative route for reaching the cross-connect while maintaining the existing line connections.

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